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A MULTIDIMENSIONAL SCALING INVESTIGATION OF THE RELATIONSHIP OF CONCEPTUAL COMPLEXITY TO A T GROUP EXPERIENCE

BY

CORINNE F. THORSELL

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF MASTER OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

EDMONTON, ALBERTA

FALL, 1970

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ABSTRACT

The present study was designed to investigate the use of multi-dimensional scaling (MDS) in the measurement of person perception data in a T group. Theories of conceptual systems functioning were applied to current T group theory and an attempt was made to see whether a T group experience would change the level of conceptual complexity of its members. The study was designed to explore the research methodology and so no control group was incorporated in the design and no hypotheses were made.

Thirteen graduate students at the University of Albert made similarity judgments of people before and after they took part in a T group experience. Two testing instruments were used at both times 1 and 2. One instrument required similarity judgments between all the persons in the T group and the other was a computerized instrument (IBM 1500 Instructional System) containing eight character descriptions to be judged according to similarity or dissimilarity.

The data were analyzed using Kruskal's non-metric MDS method so that changes in integration, number of dimensions, differentiation between self and other and differentiation between others were interpreted. No substantial changes were obtained but in general the direction of change from time 1 to time 2 was toward a decrease in abstract functioning. Impressions of the group leader regarding changes in conceptual functioning of the group members were largely not supported

by the data.

The study led to some insights regarding MDS analysis particularly in terms of the interpretation of dimensions and the judgment of integration. Some suggestions were made concerning the most effective use of MDS in these areas.

The results indicated a need to investigate further the effects of T groups on the conceptual complexity of the participants. Some suggestions for grouping according to conceptual level were made.

Many interesting problem areas in both MDS analysis and T group methods were revealed and it was recommended that a well controlled study be undertaken using some of the suggestions for measurement and design that arose from this study.

ACKNOWLEDGEMENTS

The author would like to especially thank Dr. T. O. Maguire for his assistance and encouragement throughout this study. I am also indebted to Dr. D. D. Sawatzky for his suggestions and advise.

Thanks also goes to Dr. P. Brady for his cooperation in the administration of testing instruments and for his useful evaluations of the T group. I am grateful to the group members as well for their time and attention.

Appreciation goes to Mrs. C. Levine and Mr. J. Manos who upon very short notice consented to act as judges in this study.

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CHAPTER I

INTRODUCTION

The psychology of human behavior in the realm of interpersonal relations is a relatively young science and the recent growth of "T groups" in "sensitivity training" (Bradford, Gibb and Benne, 1964) is showing signs of growth pains. Much is claimed concerning the effects and changes in persons due to T group experience but little is well developed by theory or substantiated by research. That is, the effects are seen but not clearly understood.

Much of the present research in this area has been plagued by methodological problems, and there is a strong plea by some writers (Stock, 1964; Argyris, 1967; Dunnette, 1969) for adequate methods of research and systematic theory building. Upon completing a review of studies on T groups, Campbell and Dunnette (1968) and Dunnette (1969) were disturbed to discover the poor quality of research design, control, measurement and reporting. Dunnette (1969) stated:

> To date, much research about the behavioral outcomes of T groups has suffered from problems of faulty experimental design and imprecise measurement. We seem to be trapped in a sort of 'Slough of Despond', bogged down in the mire of unsupported claims, the self-satisfaction of laboratory trained advocates, and the doubt and apprehension of non-believers. (p. 25)

Argyris (1967) strongly believes that any more diversification and change in T groups methods will be disastrous without immediate increase and improvement of research.

The present study is in response to the deficiency in theory and measurement. It is not intended to be a model of design. To bridge the gap in theory the recent advances in the study of information processing and conceptual functioning are considered. (Harvey, Hunt and Schroder, 1961; Schroder, Driver and Streufert, 1967; Driver, 1962; Bieri, 1955; 1961; 1966; Bieri, Atkins, Briar, Leaman, Miller and Tripodi, 1966; Schroder and Harvey, 1963; Dunnette, 1969; Carr, 1965). These sources provide a seemingly sound model from which to build a psychology of interpersonal and intrapersonal dynamics and interaction.

Our theoretical orientation lends itself to measurement through the use of multidimensional scaling (MDS) a method partly developed to mesh with current cognitive theories. MDS has been found to be directly applicable to the study of cognitive structure and it appears to render amenable data for interpretation. (Driver, 1962; Schroder et al, 1967). For the purposes of our study the MDS procedures of Torgerson (1958), Kruskal (1964) and Klahr (1964) are particularly relevant. It is our intension to further test and explore the application and boundaries of MDS in its relation to human conceptual organization.

Given this direction in theory and research, the focus of this study then is on the relationship of the nature of T group experience to cognitive functioning. We will be looking to see if the level of cognitive complexity of individuals is changed as a result of a sensitivity group experience.

CHAPTER II

THEORETICAL ORIENTATION

Conceptual Systems, Differentiation and Integration

The way in which a person structures his perceptions of his environment can be viewed as the basis for the study of human interaction. Kelly (1955) and Werner (1957) have stressed the role of concept formation and cognitive functioning in relation to personality and development. The concept or mediating linkage between stimulus and response is the initial structural component for the organization of perception, and subsuming the concept are the conceptual systems. The complexity of these systems has been studied by Bieri (1955; 1961; 1966) and Bieri et al (1966) in relation to other phenomena such as perception. Harvey, Hunt and Schroder (1961) have dealt with the complexity of conceptual systems in relation to training conditions and on-going stages of generalized complexity in a structure. Schroder, Driver and Streufert (1967) and Driver (1962) have been largely concerned with the integration of conceptual systems.

It is assumed by these writers that within a concept there is a system of dimensions which are "units of conceptual functioning" (Schroder et al, 1967, p. 7) and are used by a person to construe his social environment. Cognitive complexity is the capacity to respond differentially to the environment and to make multidimensional judgments of social stimuli. The term differentiation has been used to refer to the "number of unique dimensions along which stimuli ... 'take on' meaning" (Schroder et al, 1967, p. V). The more complex a conceptual

structure is the greater is the number of dimensions or the degree of differentiation in the perception of others. (Harvey et al, 1961; Schroder et al, 1967).

Beyond differentiation, the other major component of conceptual complexity is integration, which is defined by Schroder et al (1967) as "the extent to which dimensional units of information can be interrelated in different ways in order to generate new and discrepant perspectives about stimuli." (p.25) Similarly, Harvey et al (1961) view integration as the hooking together of parts or perceived dimensions. The greater the degree of integration of a cognitive system the more a person is able to tolerate ambiguity and to combine information in alternate and complex ways. Schroder et al (1967) refer to this as the integrative complexity of a person's conceptual system.

The degree of differentiation is not necessarily related to integrative complexity, but it is believed that the greater the number of dimensions the more likely is the development of integrative complexity. (Harvey et al, 1961; Schroder et al, 1967). Conversely, a high level of complexity has the potential for generating new attributes of information and as a result may increase the number of perceived dimensions. (Schroder et al, 1967).

Driver (1962) has argued that the more evenly weighted is each dimension in the judgment of stimuli the greater is the probability of an integratively complex structure. His research tends to support his hypothesis but not to substantiate it firmly.

Harvey et al (1961) believe that the central concepts of a person's cognitive structure share a similar level of complexity.

They term the integration of these central concepts into larger units as superordinate constructs. A similar concept is referred to by others as generalized complexity (Driver, 1962), belief systems (Rokeach, 1960) or schemata (Piaget, 1954).

There is considered to be a direct relationship between conceptual complexity and abstractness. Harvey et al (1961) have outlined a discrete system of stages whereby an increase in complexity is accompanied by an increase in abstractness. Schroder et al (1967) and Driver (1962) view the relationship as a continuous process and include the level of integration of a system in relation to its abstractness.

For our purposes we will use the terms integrative complexity, high conceptual complexity and abstractness of a system interchangeably.

The Self and Cognitive Theory

The concept of "self" in cognitive theory is a critical one. Harvey et al (1961) view the self as "the intertwined totality of one's concepts." (p.6) With an increase in complexity and abstraction the concept of self changes. (Harvey et al, 1961; Driver, 1962; Bieri, 1955; Schroder et al, 1967; Carr, 1965). The direction is toward greater differentiation on self from other, and the realization of internal causation of events. Harvey et al (1961) have stated that:

> The failure of the individual to differentiate between his own experience and the external world results in his self not being clearly and consistently articulated. Until the self does reach a certain growth, it does not enter as a major referent into the individual's attribution of causality. Instead of perceiving the self as a source of cause of an event, external or internal, the cause is seen to stem from external sources (p. 39).

With the development of abstractness there would come increasing self-awareness through the realization of the internal aspects of self and

others. Driver (1962) has found that with a higher level of complexity there is more consideration and use of such things as internal motivation rather than external, observable conditions. He has termed these internalistic dimensions.

The differentiation of the boundaries between self and other is fundamental to cognitive development as well as to the process of human interaction. The concretely functioning person is unable to make clear distinctions between internal and external causation and dimensions, and therefore is prone to view the world in terms of his own schemata. As a result he engages highly in projection, that is perceiving external events as being the same as one's internal representation of them. Cameron (1947) has called this assimilative projection, while Carr (1965) has referred to it as assumed similarity. Schroder et al (1967) have stated that projection is a device used by persons low in integrative complexity. The role of projection then in human relations can be viewed as a function of the individual's level of conceptual complexity.

Other results of concrete functioning and incomplete differentiation between the self and other and between others are stereotypy (i.e. perceiving the self as different from others, but not differentiating between others), rigidity and closed mindedness. (Harvey et al, 1961; Carr, 1965; Schroder et al, 1967).

Structural Evolvement and Training Methods

To produce structural change toward more abstract conceptual functioning experimentation with various group environments has been done. (Particularly Harvey et al, 1961; Schroder et al, 1967; Driver, 1962). These writers have found that a training environment has a different

effect on persons at different conceptual levels, with the relationship being curvilinear. A "U" curve is the result, whereby a training environment that is overly complex or overly simple will arrest rather than facilitate cognitive development.

At any level of abstractness "...potential for progression is largely determined by the person's capacity for making new differentiations required for progression and his capacity for integrating these parts." (Harvey et al, 1961, p. 327). Thus the structural evolvement of cognitive systems progresses only if the conceptual level of the individual permits and if the developmental conditions of the group are favorable. There may indeed be parallels to individual and group conceptual structure as it relates to abstractness and concreteness. (Harvey et al, 1961; Driver, 1962; Schroder et al, 1967).

The two criteria of a facilitating training method for structural evolvement then are that, (1) it induce openness or the flexibility to allow for change and alternative interpretations and (2) it aids progression which is the moving from more concrete to more abstract functioning. Harvey et al (1961), Schroder et al (1967) and Schroder and Harvey (1963) have explored the effects of what Harvey et al have termed interdependent training and have found that it creates a state of synchrony between individual and group forces. Schroder et al stated that:

> Interdependent training is expected to produce the most abstract structural properties if it provides an environment that does not overwhelm the subject and that encourages his explorations and allows him to experience the consequences of trying out his self-generated rules (p. 50).

The characteristics of interdependent training as described by these authors are parallel to those conditions stressed by theorists and researchers in the area of sensitivity training. The emphasis for both is on the lack of external structure or rules, encouragement of autonomous and exploratory behavior, general environmental as opposed to individual manipulation, flexibility, ambiguity, self direction and open feedback. (Harvey et al, 1961; Schroder et al, 1967; Rogers, 1967; Bugental, 1969; Stock, 1964; Weschler, 1962; Bradford, Gibb and Benne, 1964).

Recently, the emphasis in T groups has moved away from group dynamics and communication skills toward personal growth, self-awareness and internalistic dimensions, and the role of feedback is stressed as essential for this kind of development and learning. (Stock, 1964; Schein and Bennis, 1965; Weschler, 1962; Perls, 1969). Brammer and Shostrom (1960) stated that through feedback" you come to see yourself more realistically... [and you] get a more accurate image of yourself as an instrument in interpersonal relations." (p. 326) Dunnette (1969) explained that feedback ought to help perceivers "depart from assumed similarity and stereotypic prediction strategies and adopt strategies of greater social differentiation" (p. 39). He gives some evidence for the effectiveness of T groups in this regard. Cameron (1947) explained how the sharing of perspectives of others is essential in order to counteract assimilative projection.

Building a climate of trust is the sine qua non in the development of a sensitivity group, and once it is established the sharing of perspectives, feedback etc. can be carried on. (Bradford, Gibb and

Benne, 1964; Schein and Bennis, 1965; Rogers, 1951). With the above mentioned emphases in process and structure, the T group that has developed trust could be expected to induce openness and progression of cognitive systems, and thus to raise the level of conceptual complexity of its members.

RELATED LITERATURE

Conceptual Complexity

The focus of the present study is on the structure of conceptual systems, but much of the research on conceptual complexity has been concerned with content. Harvey (1966) cites studies which have related conceptual complexity to intelligence and to dogmatism, authoritarianism and other personality variables. Tuckman (1966,b) studied the relationship of creativity to conceptual complexity. Harvey et al (1961) were also concerned primarily with the content of conceptual systems.

On the other hand Schroder et al (1967) have focused on the structural properties of conceptual functioning. Sawatzky's (1969) research tended to support this emphasis and also supported the contention of Schroder et al (1967) that higher integration and not higher differentiation in person perception is related to abstract functioning as measured by the Tuckman (1966,a) scale.

Bieri (1966) found that greater complexity is an asset only if the stimulus field is also complex. He cites studies that have found that with an increase in the dimensions in a stimulus it was more frequent for cognitively simple judges to display a gain in discrimination among stimuli than cognitively complex judges who have cognitive structures that are more differentiated. Bieri concluded that cognitively complex judges have a preference for inconsistently combined dimensions.

Similarly, Dunnette (1969) has found a "U" curve between accuracy of person perception and amount of information available to conceptually complex judges. These findings concur with those mentioned previously

of Harvey et al (1961), Driver (1962) and Schroder et al (1967).

In a very thorough study Driver (1962) found a non-significant tendency for females to be more conceptually complex than males. Sawatzky (1969) reported that Higgins has also presented data in which females appeared to be more complex than males, using the Role Construct Repertory Test (Rep test) of Kelly (1955) as a measure of complexity. Crockett (1965), Hunt and Dopyera (1966), Gardiner (1968) and Little (1969) have all found similar results. It may be that interpersonal relationships have greater functional importance and concern for women than for men and that this may be a significant variable here. (Driver, 1962; Little, 1969; Crockett, 1965).

Driver (1962), like Schroder et al (1967) and Harvey et al (1961), has experimentally substantiated the contention that greater abstractness coincides with high conceptual complexity, but he has questioned how abstract and concrete functioning individuals differ with respect to complexity, and has recommended that further research on this relationship be done.

Conceptual Complexity and Group Environments

There has not been a great deal of research on the effect of T groups on abstract functioning, but those studies that have been done show some change in the participants. Schutz and Allen (1966) found a substantial increase in intellectual understanding and flexibility in personal relations following a T group. Rubin (1967) found greater acceptance and understanding of others as well as a decrease in prejudice and stereotyped thinking as a result of a T group. Harrison (1966)

using Kelly's Rep test studied the effect of a T group experience on 115 persons and found a significant increase in abstractness and complexity of concepts in interpersonal perception. A significant positive relationship between increase in complexity and degree of active involvement in the T group was also found, These changes were slight immediately after the training and increased to significant after 3 months.

Johnston (1970) used the Harvey Conceptual Systems Test and found no change in abstract functioning over a period of 4 months following a T group.

It has generally been the case that effects of T groups are discovered to be more significant after a period of months than immediately following the experience. (Dunnette, 1969; Stock, 1964; Johnston, 1970).

Dunnette (1969) used an empathy questionnaire that he developed to study T groups which were rated as having a high quality of interpersonal interaction and found that the individuals showed less assumed similarity, less stereotypy and greater social differentiation in their perceptions of others. He concluded that T groups may be an effective medium for getting to know the self and others better.

Bunker (1965) when citing a study done by Harrison and Oshry reported that those who learned the most in T groups were the ones who were described by others prior to the training as being open to new ideas, and those who learned little in a T group were described as being closed-minded. With conceptual complexity being related to degree of openness in thinking it may be that a certain level of complexity must be reached by an individual before a T group can have a significant effect. Harvey et al (1961) suggested that the most meaningful basis for grouping

would be classification according to the conceptual structure of the members.

Multidimensional Scaling and Conceptual Complexity

A general review of the measurement of conceptual complexity can be found in Bieri (1966), Schroder et al, (1967), Sawatzky (1969) and Bower (1969). As yet the use of MDS in this area has not been extensive. Schroder et al and Driver (1962) appear to be the only ones who report its use. Both have stated the applicability of this measure to cognitive structure and to complex social areas of human interaction. Driver stressed that one of the main virtues of MDS is that it does not specify beforehand the kind or number of dimensions to be used, but allows subjects to generate their own dimensions of perceived similarity or dissimilarity among stimuli. Both Driver and Schroder et al have used MDS to discover the number of dimensions used by subjects and have recommended using instructions such as "similarity as people" to reveal all critical dimensions of the stimulus in general.

MDS can also be used to determine the level of integration of conceptual systems, and in fact Schroder et al have suggested that at present MDS is the best general operational method available to study integration. They indicated that it can be done in three ways: (1) by looking at the weighting of dimensions (as in Driver, 1962); (2) by examining the amount of discrimination along dimensions and (3) by doing repeated MDS analyses.

One of the problems with MDS is that dimensions which relate to less than all stimuli may be omitted in the mathematical procedure.

Schroder et al have indicated that it may be that such dimensions are included in MDS data with unrelated stimuli receiving zero scores on the dimension.

Both Driver and Schroder et al have suggested that in order to interpret particular dimensions more adequately, other measures such as the Rep test or Object Sorting (Goldstein and Scheerer, 1941; Sloane 1959; Clayton, 1959; Scott, 1961; 1962) could be used along with MDS.

CHAPTER III

METHOD & DESIGN

The main purpose of this study was twofold:

(1) to investigate the application of MDS as a method of evaluating person perception data in a T group experience;

(2) to determine whether a T group experience would aid in the development of the conceptual complexity of its members.

A control group was not included in the study and hypotheses were not made as the study was primarily an exploratory one.

A secondary purpose was to evaluate the effects of a T group on the conceptual level of counseling students. Some of the correlates of high conceptual functioning such as open-mindedness (Rokeach, 1960) and empathy (Katz, 1963; Truax and Carkuff, 1967; Dunnette, 1969) are believed to be necessary qualities of counselors and the T group has been considered to be one of the most effective training devices in counselor education for the development of these qualities (Truax and Carkuff, 1967).

The Sample

The sample in this study consisted of 1 part-time and 12 full time graduate students in the Department of Educational Psychology at the University of Alberta. There were 5 females and 8 males ranging from 22 to 45 years of age. All of the subjects were majoring in counseling psychology except for one male who was in the area of measurement.

The T Group

The T group was held once a week over a 12 week period from

January to March 1970. Each session lasted for approximately 4 hours, giving a total of about 48 group hours. Dr. Paul Brady of the Educational Psychology Department led the group which was held as a graduate course in the counselor training program. All those participating in the T group earned credit for a half course. The focus of the group was first on developing trust and then on self exploration and expression of feelings.

Procedure

The subjects were tested on a pre and post test basis with one instrument being administered at the beginning of the second group meeting and the other, a computerized instrument, on the day following the second meeting. For the post testing both instruments were administered on the 7th day following the last group session, with the computerized instrument being given first. The pre and post testing took approximately one hour each time with the computerized instrument occupying more than half of that time. One female (subject H) was absent for testing on the computerized instrument.

Testing Instruments

An instrument was designed to measure similarity judgments of the persons in the T group. All members of the group were asked to judge the similarity of all possible pairs of people in the group. The scale of similarity was given from 1 to 5 with the half points being considered. The mid point was at 3 with 1 being very dissimilar. Appendix A gives a copy of this group test. As Schroder et al (1967) recommended, general instructions concerning similarity as persons were given. The instructions were as follows:

> Even though you may not know some of these people very well I would like you to consider each of the pairs and rate them in terms of how alike, or dissimilar they appear to be to you. It is quite possible for people to be similar in many different ways and therefore judgments which may seem inconsistent on the surface may in fact be the opposite. Try to consider each pair independently of each other pair. A rating of 1 means extremely similar, a rating of 5 suggests extreme dissimilarity. You may or may not find yourself using the extreme ends of the scale but make an attempt to discriminate among your ratings. Put an X on the scale to indicate the degree of similarity. X's may be placed on the points or between them.
>
> 1--X-2----3----4----5 rating of 1.5
>
> 1----2----X----4----5 rating of 3
>
> Don't spend too long on any rating, first impressions are important.

At time 2 the first sentence was ammended to read:

> I would like you to consider each of these pairs of people and rate them in terms of how alike or dissimilar they appear to be to you.

There were no other changes.

These instructions were read out aloud to the subjects by the writer.

The second testing instrument was taken from Glass (1967) who examined teachers' perceptions of students by composing 8 male student descriptions each containing 3 predetermined dimensions: (1) high vs. low aptitude, (2) cooperative vs. uncooperative classroom behavior and (3) stable-accepting vs. unstable-rejecting relationships with parents. (See Appendix B). Using an IBM 1500 Instructional system each of these descriptions or stimuli was shown sequentially in order to make the subjects familiar with the range of stimuli. Pairs of stimuli were then shown and the subjects were required to indicate the similarity

or dissimilarity of the paired descriptions on a 9 point scale from 1, very dissimilar to 9, very similar. Since one stimulus in a pair was positioned above the other, there were 2 sets of 28 stimulus pairs. Within the sets the 28 pairs were randomly ordered so that half of the subjects received one order of a stimulus pair while the other half received the other order. Using this same method Maguire and Clark (1969) found previously that there was no order effect. With the 1500 program each subject was able to respond in his own time.

The reliability of this instrument was supported by Maguire and Clark (1969) who used it with Industrial Arts teachers and found a configuration very similar to that of Glass (1967).

The validity of both the instruments used in this study lies in the method of MDS to be discussed next.

Statistical Analysis

"The problem of multidimensional scaling, broadly stated, is to find n points whose interpoint distances match in some sense the experimental dissimilarity of n objects." (Kruskal, 1964, p.1). The estimates of similarity are transformed into distances in a "concept space" of unknown dimensionality so that the more similar two stimuli are perceived, the closer they are on the dimensions of this space. With a monotone relationship between dissimilarity and distance as a goal (Shepard, 1962), Kruskal (1964) developed a mathematical procedure incorporating a quantitive measure of monotonicity. This he called the stress, and it is a measure of the goodness of fit of a configuration to the data. Put another way, stress is the residual variance or departure from the hypothesis that the dissimilarities correspond to the

interpoint distances of the configuration. The best fitting configuration of points is the configuration of minimum stress. Kruskal (1964) suggested the following evaluation:

Stress	Goodness of Fit
20%	poor
10%	fair
5%	good
2-1/2%	excellent
0%	"perfect"

"Perfect" here refers to a perfect monotone relationship between dissimilarities and distances. More recent work by Klahr (1969) indicates that the goodness of stress is a function of the number of points.

The calculation of the stress, as outlined by Kruskal begins with an arbitrary placement of n points in the space. The points are then systematically moved in an effort to achieve monotonicity between interpoint distances and interstimulus similarity. The minimum-stress configuration is found through an iterative process of successive approximations of the points. Kruskal's method normalizes the stress so that it is invariant under uniform stretching or shrinking of the configuration.

The stress is calculated for "t" dimensions and graphs showing the dependence of minimum stress on dimension are made. As the number of dimensions increases stress decreases, and thus it is "reasonable to choose a value of t which makes the stress acceptably small, and for which further increase in t does not significantly reduce stress." (Kruskal, 1964, p. 16). Good data exhibit a noticeable elbow in the curve and thus the appropriate value of t is indicated. (Kruskal, 1964).

CHAPTER IV

RESULTS AND INTERPRETATION

Using Kruskal's (1964) non-metric MDS procedure the stresses for all dimensional configurations from 1 to 8 dimensions were calculated. All calculations were performed on the data collected for each subject. The set of stress values is shown in Tables 1 to 4. The statistical significance of the stress values were checked using Klahr's (1969) investigation of Kruskal's method and all found to be significant at the .05 level, indicating that the configurations were not based on random data. In order to define the number of dimensions it was decided to use Kruskal's "good" stress (5%) as the cut-off value.

Once the number of dimensions was determined at attempt was made to interpret each of them by examining the ordering of the stimuli along the dimension. Tables 5 and 6 give the configurations of the ordered stimuli. In the case of the 1500 data a comparison was made with the results of Glass (1967) to see if the interpreted dimensions corresponded to the three dimensions of aptitude, behavior and home.

Schroder et al (1967) noted that there are a number of manifestations of discrimination. For the present study it was most appropriate to consider fineness of the organization of the stimuli along the dimension as discrimination. Operationally, a subject was said to exhibit increased discrimination from time 1 to time 2 if the positions of the stimuli on the dimensions were uniformly spaced and if the stimuli covered a broader range along the dimension. The change in discrimination was measured by three independent raters (one of whom was the

TABLE I

STRESS FOR 13 SUBJECTS FOR 8 DIMENSIONS

FROM GROUP TEST DATA - TIME 1

	DIMENSIONS							
Subject	1	2	3	4	5	6	7	8
A	.315	.160	.034	.010	.008	.007	.010	.008
B	.330	.098	.046	.011	.010	.006	.009	.009
C	.303	.117	.110	.043	.026	.010	.009	.010
D	.245	.162	.081	.031	.014	.010	.008	.008
E	.224	.060	.044	.010	.010	.009	.009	.009
F	.009	.010	.010	.010	.004	.005	.004	.005
G	.190	.066	.010	.006	.009	.010	.005	.008
H	.307	.174	.115	.055	.020	.010	.010	.008
I	.334	.181	.049	.023	.009	.009	.010	.009
J	.234	.092	.025	.010	.007	.008	.006	.007
K	.006	.008	.010	.006	.001	.005	.009	.007
L	.207	.091	.050	.022	.010	.009	.007	.009
M	.338	.089	.029	.023	.010	.004	.010	.006

TABLE 2

STRESS FOR 13 SUBJECTS FOR 8 DIMENSIONS

FROM GROUP TEST DATA - TIME 2

	DIMENSIONS							
Subject	1	2	3	4	5	6	7	8
A	.308	.193	.122	.067	.020	.010	.010	.009
B	.279	.090	.035	.010	.009	.009	.009	.009
C	.231	.101	.035	.009	.009	.010	.007	.008
D	.265	.080	.053	.010	.008	.009	.008	.010
E	.238	.111	.056	.020	.010	.010	.008	.008
F	.010	.014	.007	.007	.006	.007	.010	.004
G	.328	.117	.060	.021	.014	.009	.010	.010
H	.318	.178	.081	.029	.010	.009	.009	.009
I	.280	.074	.053	.010	.010	.010	.010	.010
J	.324	.051	.020	.010	.010	.008	.005	.009
K	.091	.010	.009	.009	.008	.007	.002	.006
L	.210	.104	.057	.024	.009	.007	.003	.007
M	.261	.092	.032	.016	.010	.010	.008	.010

TABLE 3

STRESS FOR 12 SUBJECTS FOR 8 DIMENSIONS

FROM 1500 PROGRAM - TIME 1

	DIMENSIONS							
Subject	1	2	3	4	5	6	7	8
A	.323	.078	.010	.010	.007	.007	.006	.010
B	.182	.043	.010	.003	.009	.006	.007	.010
C	.296	.112	.040	.005	.006	.006	.002	.007
D	.316	.152	.011	.010	.009	.009	.000	.002
E	.297	.091	.009	.008	.000	.004	.006	.008
F	.169	.023	.010	.003	.003	.002	.005	.003
G	.296	.151	.009	.004	.007	.008	.003	.003
I	.290	.112	,009	.008	.008	.000	.002	.002
J	.285	.162	.038	.010	.009	.007	.006	.005
K	.287	.085	.010	.009	.007	.002	.005	.001
L	.285	.106	.045	.010	.009	.008	.006	.004
M	.302	.090	.010	.007	.004	.005	.004	.005

TABLE 4

STRESS FOR 12 SUBJECTS FOR 8 DIMENSIONS

FROM 1500 PROGRAM DATA - TIME 2

	DIMENSIONS							
Subject	1	2	3	4	5	6	7	8
A	.235	.039	.001	.005	.003	.000	.000	.000
B	.206	.107	.029	.003	.005	.009	.003	.008
C	.310	.120	.068	.006	.004	.004	.001	.004
D	.285	.072	.009	.006	.005	.006	.008	.006
E	.337	.194	.038	.009	.006	.003	.002	.002
F	.103	.010	.008	.000	.004	.003	.000	.003
G	.321	.113	.066	.009	.010	.002	.002	.002
I	.290	.081	.009	.007	.006	.002	.001	.009
J	.189	.035	.007	.004	.000	.007	.005	.007
K	.197	.009	.009	.006	.008	.000	.000	.000
L	.189	.090	.000	.007	.000	.002	.005	.004
M	.382	.143	.049	.009	.009	.008	.008	.009

TABLE 5

CONFIGURATIONS OF THE ORDERED STIMULI FOR 12 SUBJECTS - 1500 PROGRAM DATA

		Time 1 Dimension			Time 2 Dimension		
Subject		1	2	3	1	2	
A	1	0.803	-0.468	-0.168	0.575	-0.855	
	2	-0.104	0.798	-0.021	-0.336	0.934	
	3	0.225	-0.269	1.340	1.055	0.403	
	4	-0.359	0.083	-1.204	0.192	-0.138	
	5	0.768	-0.518	-0.337	0.822	0.936	
	6	-0.753	-0.606	0.148	-1.031	0.110	
	7	0.022	0.770	0.151	-0.634	-1.020	
	8	-0.602	0.209	0.090	-0.642	-0.371	
B		1	2		1	2	3
	1	0.738	0.080		1.011	-0.047	-0.486
	2	-0.077	0.567		0.466	0.871	-0.169
	3	-0.480	-0.237		-0.000	-0.048	1.108
	4	0.505	-0.977		0.088	-0.146	0.111
	5	-1.189	0.415		-0.429	-0.981	0.624
	6	0.892	0.630		-0.395	0.921	0.068
	7	-1.347	-0.245		-0.645	-0.780	-0.470
	8	0.958	-0.232		-0.096	0.209	-0.786

TABLE 5 (Continued)

Subject		Time 1 Dimension 1	2	3		Time 2 Dimension 1	2	3	4
C	1	0.484	0.459	0.822	1	0.872	0.577	0.264	0.503
	2	0.144	0.673	0.184	2.	0.083	0.704	0.139	0.552
	3	0.219	0.076	0.940	3	0.025	0.065	0.942	0.357
	4	0.242	0.418	0.893	4	0.291	0.265	0.071	0,827
	5	0.008	1.080	0.086	5	0.791	0.369	0.561	0.209
	6	0.367	0.296	0.754	6	0.374	0.279	0.174	0.202
	7	1.140	0.217	0.136	7	0.711	0.647	0.465	0.246
	8	0.931	0.451	0.059	8	0.760	0.071	0.036	0.838
		1	2	3		1	2	3	
D	1	1.137	0.214	0.632	1	0.381	0.026	0.639	
	2	0.219	0.923	0.399	2	0.188	1.183	0.013	
	3	0.219	0.063	1.003	3	0.271	0.092	0.746	
	4	0.233	0.732	0.476	4	0.952	0.532	0.361	
	5	0.218	0.741	0.492	5	0.545	0.300	0.860	
	6	0.490	0.202	0.264	6	0.074	0.376	0.004	
	7	0.733	0.378	0.569	7	0.254	0.987	0.192	
	8	0.366	0.877	0.480	8	0.919	0.458	0.806	

TABLE 5 (Continued)

		Time 1			Time 2		
		Dimension			Dimension		
Subject		1	2	3	1	2	3
E	1	0.691	-0.725	0.267	0.968	0.219	-0.532
	2	-0.106	0.511	0.345	0.083	0.129	0.163
	3	0.052	0.141	1.181	0.148	0.450	1.213
	4	0.683	0.489	-0.091	-0.167	0.109	-0.871
	5	0.574	-0.148	-1.070	0.371	-0.651	-0.494
	6	-0.978	0.220	0.458	-0.450	0.953	-0.288
	7	-0.651	-0.639	-0.253	-0.273	-0.543	0.945
	8	-0.266	0.151	-0.839	-0.680	-0.667	-0.137
		1	2		1	2	
F	1	0.920	0.183		1.100	-0.386	
	2	-0.289	0.076		0.187	0.905	
	3	-0.560	-0.808		-0.425	0.471	
	4	0.392	-0.575		0.569	-0.947	
	5	-1.207	0.039		-0.931	-0.280	
	6	0.221	0.830		0.045	0.434	
	7	-0.743	0.900		-1.213	-0.575	
	8	1.267	-0.645		1.041	0.378	

TABLE 5 (Continued)

		Time 1				Time 2			
		Dimension				Dimension			
Subject		1	2	3		1	2	3	4
G	1	0.972	-0.413	-0.545	1	0.812	-0.286	-0.246	-0.947
	2	0.048	0.715	-0.137	2	0.126	0.537	-0.209	-0.214
	3	-0.545	0.290	1.051	3	-0.063	0.332	0.859	-0.044
	4	0.112	0.685	-0.175	4	0.365	-0.133	0.373	0.703
	5	-0.257	-0.660	0.035	5	0.042	-0.778	-0.252	-0.142
	6	-0.784	0.076	-1.089	6	0.435	0.035	-0.701	0.697
	7	0.773	-0.055	0.798	7	-1.051	0.509	0.184	-0.537
	8	-0.319	-0.636	0.062	8	-0.666	-0.218	-0.008	0.483
		1	2	3		1	2	3	
I	1	0.904	-0.401	-0.305	1	1.053	-0.191	-0.713	
	2	-0.350	0.521	-0.128	2	0.213	0.506	-0.422	
	3	-0.402	0.120	1.211	3	0.191	0.536	0.930	
	4	-0.636	-0.050	-0.148	4	-0.216	-0.331	0.298	
	5	0.164	0.947	0.189	5	-0.161	-1.372	0.533	
	6	-0.486	-0.854	-0.276	6	-0.640	-0.262	-0.624	
	7	0.416	0.052	-1.236	7	0.306	0.551	-0.223	
	8	0.390	-0.334	0.693	8	-0.746	0.563	0.222	

TABLE 5 (Continued)

		Time 1				Time 2	
		Dimension				Dimension	
Subject		1	2	3		1	2
J	1	1.065	0.049	-0.507	1	0.654	-0.979
	2	0.195	1.067	0.388	2	-0.196	0.667
	3	0.128	-0.103	0.611	3	-0.025	0.976
	4	0.063	-0.699	-0.492	4	0.230	-0.965
	5	-0.850	0.412	0.280	5	-0.917	0.117
	6	0.119	-0.012	0.725	6	0.371	0.946
	7	-0.755	-1.063	-0.112	7	-1.050	-0.235
	8	0.035	0.349	-0.894	8	0.934	-0.527
		1	2	3		1	2
K	1	1.127	-1.035	0.091	1	1.119	-0.360
	2	-0.071	0.841	-0.607	2	0.173	0.849
	3	0.270	-0.501	0.927	3	1.113	-0.389
	4	0.111	-0.415	-0.353	4	-0.405	-0.565
	5	-0.019	-0.476	-0.364	5	-0.398	-0.606
	6	-0.179	0.763	-0.683	6	0.164	0.841
	7	-0.541	0.515	0.563	7	-1.321	0.732
	8	-0.697	0.307	0.426	8	-0.446	-0.503

TABLE 5 (Concluded)

Subject		Time 1 Dimension 1	2	3		Time 2 Dimension 1	2	3
L	1	0.689	-0.772	0.034	1	1.164	-0.807	-0.607
	2	-0.418	0.634	0.381	2	-0.129	0.751	-0.072
	3	0.227	-0.035	1.045	3	0.076	0.023	0.945
	4	0.769	0.354	-0.242	4	0.276	0.617	-0.351
	5	0.316	-0.806	-0.770	5	-0.878	0.501	0.621
	6	-0.158	0.919	-0.486	6	0.641	-0.163	-0.140
	7	-0.714	-0.443	0.566	7	-0.572	-0.550	0.308
	8	-0.712	0.148	-0.529	8	-0.580	-0.373	-0.704
		1	2	3		1	2	3
M	1	0.566	-0.257	-0.838	1	0.283	-0.015	-0.728
	2	-0.439	0.391	-0.466	2	-0.218	0.755	0.126
	3	-0.652	-0.140	0.642	3	0.160	0.212	1.184
	4	0.429	-0.626	0.355	4	0.824	-0.779	-0.102
	5	0.717	0.491	0.087	5	-0.033	-0.870	-0.321
	6	-0.340	-1.075	-0.562	6	-0.835	-0.079	-0.461
	7	-0.793	1.101	0.487	7	0.484	1.010	-0.304
	8	0.512	0.117	0.296	8	-0.664	-0.232	0.606

TABLE 6

CONFIGURATIONS OF THE ORDERED STIMULI

FOR 13 SUBJECTS - GROUP TEST DATA

		Time 1				Time 2				
		Dimension				Dimension				
Subject		1	2	3		1	2	3	4	5
A	1	0.518	-0.501	0.929	1	0.356	-0.074	-0.778	-0.302	-0.313
	2	-0.991	0.616	0.239	2	-0.631	0.080	-0.911	0.203	-0.508
	3	-0.313	-0.689	0.051	3	0.415	-0.466	1.036	-0.311	0.363
	4	0.788	-0.429	-0.676	4	-0.187	-0.158	0.107	0.806	-0.510
	5	-0.446	0.361	-0.873	5	-0.017	-0.186	0.672	0.479	0.579
	6	-0.409	-0.684	-0.002	6	0.481	0.571	-0.277	-0.304	0.318
	7	0.109	-0.820	0.510	7	-0.196	0.248	-0.189	-0.379	-0.866
	8	-0.426	0.277	-1.014	8	-0.361	-0.377	-0.280	-0.568	0.234
	9	0.845	-0.339	-0.597	9	0.535	-0.267	0.485	-0.412	-0.221
	10	0.344	0.654	0.221	10	0.411	0.603	0.073	0.496	-0.270
	11	0.473	0.521	0.283	11	-0.618	0.018	0.611	-0.216	0.051
	12	0.386	0.647	0.211	12	-0.345	0.579	-0.227	0.209	0.656
	13	-0.876	0.388	0.719	13	0.157	-0.571	-0.320	0.297	0.485

TABLE 6 (Continued)

		Time 1			Time 2		
		Dimension			Dimension		
Subject		1	2	3	1	2	3
B	1	0.759	-0.689	0.139	0.440	-1.211	-0.207
	2	-0.218	-0.159	-1.088	-0.337	0.216	-0.001
	3	-0.130	-0.408	1.300	-0.077	-0.749	0.847
	4	-0.059	0.672	0.189	0.122	0.597	0.505
	5	1.030	0.218	-0.134	0.786	0.251	-0.434
	6	-0.454	0.350	-0.335	-0.361	0.376	0.393
	7	-0.540	0.065	-0.873	-0.652	-0.307	-0.527
	8	-0.857	-0.764	0.359	-0.793	-1.199	-0.156
	9	0.591	-0.880	-0.120	1.328	-0.459	0.340
	10	-0.048	0.591	-0.149	-0.254	0.866	-0.327
	11	0.322	-0.274	1.228	0.266	-0.148	0.227
	12	-0.156	0.646	-0.314	-0.233	0.907	-0.332
	13	-0.239	0.632	-0.202	-0.234	0.860	-0.329

TABLE 6 (Continued)

		Time 1					Time 2		
		Dimension					Dimension		
Subject		1	2	3	4		1	2	3
C	1	0.341	-0.859	-0.249	0.110	1	0.760	-0.252	-0.707
	2	-0.876	0.763	0.292	-0.374	2	-0.832	0.320	0.426
	3	-0.056	-0.127	0.944	-0.264	3	-0.890	0.025	0.417
	4	-0.388	-0.341	-0.618	0.891	4	-0.513	-0.792	0.153
	5	-0.444	-0.299	-0.218	-0.569	5	0.577	-0.675	0.509
	6	0.046	0.452	-0.576	-0.357	6	-0.740	0.161	-0.233
	7	-0.133	0.692	0,842	-0.546	7	-0.395	-0.080	-0.774
	8	0.736	-0.107	-0.867	-0.100	8	0.518	-0.260	-1.016
	9	1.021	0.004	0.100	-0.360	9	1.086	-0.497	-0.667
	10	-0.386	0.104	-0.165	0.239	10	0.335	0.582	0.248
	11	-0.299	-0.573	0.408	-0.275	11	-0.576	0.118	1.036
	12	0.151	0.579	0.090	0.691	12	0.293	0.601	0.476
	13	0.287	-0.288	0.016	0.914	13	0.377	0.750	0.133

TABLE 6 (Continued)

		Time 1					Time 2			
		Dimension					Dimension			
Subject		1	2	3	4		1	2	3	4
D	1	0.320	-0.048	-0.622	-0.408	1	0.596	-0.194	0.031	-0.175
	2	-0.216	0.398	-0.342	-0.958	2	0.060	1.012	0.056	0.112
	3	-0.427	-0.261	0.846	-0.809	3	-0.687	-0.604	0.307	0.019
	4	-0.572	0.461	-0.416	0.359	4	-0.098	-0.047	-0.539	0.863
	5-	-0.440	-0.594	-0.850	-0.218	5	0.451	0.190	0.413	-0.883
	6	-0.020	-0.725	-0.182	-0.274	6	-0.278	-0.484	-0.479	-0.964
	7	0.016	-0.017	-0.034	0.162	7	-0.733	0.069	-0.398	0.157
	8	0.531	-0.266	0.561	0.496	8	-0.163	-1.202	-0.268	0.142
	9	1.001	0.215	-0.145	-0.442	9	0.637	-0.203	-0.038	-0.128
	10	-0.015	0.838	0.167	0.227	10	-0.158	0.854	-0.391	-0.118
	11	0.026	0.229	0.726	-0.163	11	0.551	0.196	0.858	-0.538
	12	0.028	-0.285	-0.367	1.422	12	-0.091	0.020	-0.206	0.941
	13	-0.232	0.054	0.658	0.605	13	-0.087	0.392	0.654	0.571

TABLE 6 (Continued)

		Time 1				Time 2				
		Dimension				Dimension				
Subject		1	2	3		1	2	3	4	5
E	1	0.952	-0.452	-0.135	1	0.273	-0.796	-0.284	-0.647	-0.446
	2	0.112	0.306	-1.479	2	-0.523	0.877	-0.035	-0.564	-0.503
	3	0.086	-0.615	0.540	3	-0.229	-0.661	0.576	-0.202	-0.359
	4	-0.394	-0.419	-0.350	4	-0.171	-0.449	0.271	0.376	0.020
	5	-0.257	-0.789	0.276	5	-0.064	-0.236	-0.029	-0.092	0.697
	6	-0.610	0.153	-0.156	6	-0.076	-0.070	-0.495	0.228	-0.018
	7	0.130	-0.466	-1.274	7	-0.547	0.210	-0.433	-0.289	-0.832
	8	-0.891	0.382	0.186	8	-0.146	-0.215	-0.494	-0.639	0.092
	9	0.821	-0.039	-0.198	9	1.375	-0.159	0.202	-0.017	-0.053
	10	-0.202	0.371	0.658	10	-0.008	0.650	0.134	-0.007	0.584
	11	0.063	-0.282	0.811	11	0.194	0.407	0.687	0.074	-0.081
	12	0.093	0.913	0.512	12	0.003	0.200	0.069	1.084	0.364
	13	0.097	0.937	0.609	13	-0.080	0.243	-0.170	0.696	0.535

TABLE 6 (Continued)

		Time 1		Time 2
		Dimension		Dimension
Subject		1		1
F	1	0.220	1	-0.215
	2	0.239	2	-0.368
	3	0.232	3	-0.373
	4	-3.456	4	-0.269
	5	0.328	5	-0.340
	6	0.287	6	-0.286
	7	0.199	7	-0.316
	8	0.370	8	-0.252
	9	0.466	9	3.459
	10	0.306	10	-0.334
	11	0.291	11	-0.224
	12	0.248	12	-0.294
	13	0.269	13	-0.189

TABLE 6 (Continued)

		Time 1				Time 2			
		Dimension				Dimension			
Subject		1	2	3		1	2	3	4
G	1	-0.220	-0.923	-0.293	1	0.160	-0.690	0.402	-0.778
	2	-0.002	1.029	-0.730	2	-0.386	0.497	-0.635	-0.171
	3	-0.391	0.221	-0.718	3	-0.020	-0.180	0.474	-1.068
	4	-0.151	0.170	0.655	4	-0.451	-0.146	-0.656	-0.056
	5	0.471	0.976	0.003	5	-0.296	0.308	0.431	0.744
	6	-0.597	-0.563	0.403	6	-0.630	0.338	0.006	0.171
	7	-0.571	-0.229	-0.699	7	-0.050	0.507	-0.583	-0.350
	8	1.325	0.142	0.639	8	-0.084	-0.992	-0.329	-0.095
	9	0.986	-0.297	-0.107	9	1.241	0.180	0.138	-0.293
	10	-0.738	0.310	0.054	10	0.029	0.754	-0.174	0.360
	11	0.554	-0.983	0.763	11	0.252	-0.297	0.951	0.341
	12	0.030	-0.125	-0.084	12	-0.166	0.385	0.459	0.740
	13	-0.695	0.271	0.115	13	0.401	-0.664	-0.484	0.455

TABLE 6 (Continued)

		Time 1					Time 2				
		Dimension					Dimension				
Subject		1	2	3	4	5		1	2	3	4
H	1	-0.225	-0.560	-0.159	-0.741	-0.480	1	-0.131	-0.131	0.035	-0.955
	2	-0.585	0.488	-0.187	-0.441	-0.180	2	-0.411	0.362	-0.085	-0.600
	3	0.094	0.764	-0.105	-0.103	-0.323	3	0.238	-0.659	-0.279	-0.226
	4	-0.424	-0.430	-0.317	0.485	-0.503	4	-0.661	-0.628	-0.412	0.319
	5	-0.749	-0.061	0.565	-0.024	0.421	5	1.221	-0.064	-0.266	0.405
	6	-0.140	-0.387	0.088	0.550	-0.366	6	-0.324	-0.344	-0.304	0.466
	7	0.289	-0.516	0.017	-0.230	0.541	7	0.012	0.179	1.067	-0.221
	8	0.603	-0.161	-0.714	0.090	-0.362	8	-0.428	-0.513	0.513	-0.106
	9	0.884	0.240	0.329	0.383	0.057	9	0.920	-0.287	-0.574	-0.684
	10	0.028	0.494	0.238	-0.582	-0.008	10	-0.003	0.851	-0.287	0.048
	11	-0.028	-0.448	0.929	-0.353	-0.326	11	-0.244	0.472	0.612	0.026
	12	-0.036	0.254	0.117	0.875	0.662	12	0.330	0.260	0.437	0.781
	13	0.287	0.323	-0.803	0.091	0.867	13	-0.519	0.504	-0.458	0.746

TABLE 6 (Continued)

		Time 1				Time 2			
		Dimension				Dimension			
Subject		1	2	3		1	2	3	4
I	1	0.025	-0.678	-0.235	1	0.124	-1.592	-0.221	-1.102
	2	-1.179	-0.282	-0.210	2	0.011	0.421	0.414	-0.410
	3	-0.588	-0.684	1.188	3	0.033	-0.652	0.094	-0.686
	4	0.281	0.081	0.292	4	-0.268	0.127	-0.067	0.480
	5	-0.123	0.620	-0.878	5	-0.184	-0.263	0.167	0.375
	6	-0.236	-0.228	-0.619	6	0.021	0.009	0.273	0.695
	7	-0.410	0.738	0.518	7	-0.408	0.098	-0.538	-0.616
	8	0.041	0.520	1.171	8	0.633	0.239	-0.814	-0.723
	9	1.158	-0.238	0.361	9	0.757	-0.018	-0.051	0.001
	10	0.007	0.597	-0.218	10	-0.082	0.559	0.051	0.566
	11	0.586	-0.818	0.127	11	-0.634	0.349	0.905	0.267
	12	0.219	0.209	-0.749	12	0.083	0.010	0.125	0.871
	13	0.219	0.209	=0.749	13	-0.086	0.713	-0.339	0.284

TABLE 6 (Continued)

		Time 1				Time 2		
		Dimension				Dimension		
Subject		1	2	3		1	2	3
J	1	-0.079	-1.056	-0.143	1	0.143	-1.507	0.019
	2	-0.607	0.112	0.530	2	-0.359	0.421	0.246
	3	0.305	-1.063	0.875	3	-0.271	-0.865	0.367
	4	0.850	-0.255	-1.133	4	0.247	-0.386	-0.458
	5	0.165	-0.780	-0.518	5	0.631	0.099	0.727
	6	-0.621	0.348	-0.501	6	0.229	0.703	-0.265
	7	-0.650	0.330	-0.223	7	-0.948	0.489	-0.588
	8	0.767	0.187	0.249	8	-0.849	-0.761	-0.262
	9	0.792	-0.073	-0.081	9	0.872	0.214	-0.145
	10	0.271	0.786	-0.368	10	-0.277	0.378	0.316
	11	-0.361	0.040	0.714	11	0.437	0.197	0.596
	12	-0.230	1.112	0.594	12	0.524	1.311	0.202
	13	-0.602	0.312	0.006	13	-0.381	-0.293	-0.753

TABLE 6 (Continued)

		Time 1		Time 2	
		Dimension		Dimension	
Subject		1		1	2
K	1	2.469	1	0.812	-1.417
	2	-0.536	2	-0.186	0.402
	3	1.038	3	0.349	-0.498
	4	-0.446	4	-0.664	0.214
	5	-0.487	5	-0.631	0.513
	6	-0.487	6	-0.383	0.452
	7	-0.447	7	-0.634	-0.255
	8	0.997	8	-0.212	-1.368
	9	0.980	9	1,849	-0.203
	10	-0.509	10	0.101	0.495
	11	-0.450	11	-0.290	-0.206
	12	-1.058	12	-0.324	1.201
	13	-1.063	13	0.214	0.671

TABLE 6 (Continued)

		Time 1				Time 2			
		Dimension				Dimension			
Subject		1	2	3		1	2	3	4
L	1	0.351	-0.725	0.306	1	0.203	-0.824	0.166	-0.741
	2	-0.600	-0.133	0.224	2	-0.766	0.187	-0.383	-0.449
	3	-0.149	-0.105	1.191	3	-0.157	-0.553	0.077	-1.008
	4	0.147	-0.798	0.002	4	-0.736	0.123	-0.629	0.833
	5	0.247	0.404	-0.733	5	0.151	0.613	0.424	0.333
	6	-0.408	-0.090	-0.177	6	-0.180	-0.525	0.176	0.306
	7	0.394	0.278	0.055	7	-0.172	0.190	0.087	-0.851
	8	0.846	0.065	0.734	8	0.412	-0.211	-0.372	-0.735
	9	0.186	-0.361	-0.656	9	0.475	0.257	-0.547	-0.007
	10	0.683	0.757	0.084	10	0.338	0.730	0.039	0.307
	11	0.009	-0.094	0.932	11	-0.432	0.018	0.734	0.176
	12	-0.575	1.026	-0.752	12	0.368	0.575	0.163	1.098
	13	-1.130	-0.224	-1.209	13	0.496	-0.581	0.062	0.739

TABLE 6 (Conclusion)

		Time 1				Time 2		
		Dimension				Dimension		
Subject		1	2	3		1	2	3
M	1	-0.386	-0.866	-0.038	1	0.307	-0.990	0.362
	2	-0.054	0.205	-0.767	2	-0.423	0.614	-0.295
	3	-0.039	-1.292	0.618	3	0.327	-1.022	0.384
	4	0.441	-0.241	0.623	4	-0.752	0.358	0.272
	5	0.002	0.330	0.251	5	-0.900	0.056	-0.373
	6	0.308	0.396	-0.531	6	0.152	0.746	0.210
	7	-0.426	-0.213	-0.150	7	0.611	-0.717	-0.650
	8	0.180	-0.498	-0.578	8	0.865	0.011	-0.330
	9	0.761	-0.559	-0.051	9	0.823	-0.589	0.001
	10	-0.752	1.069	-0.335	10	-0.371	0.616	-0.328
	11	-0.267	-0.260	1.301	11	-0.095	-0.084	1.328
	12	-0.367	1.313	-0.148	12	-0.176	0.837	0.361
	13	0.600	0.616	-0.194	13	-0.368	0.165	-0.942

the investigator). The matrices of interjudge agreement on discrimination are shown in Table 7. It was found that the judges never gave opposite judgments, but that they differed only in their perception of degree of change. So, for example, judge A tended to be most conservative assigning 8 "no change" ratings out of 12 whereas Judge B assigned only 2 "no change" ratings out of 12.

Schroder et al have indicated that with more abstract conceptual systems there should be more discrimination along dimensions, and thus it was decided that the judgments of change in discrimination from time 1 to time 2 are a measure of the change in the level of integration of a system.

For the group test data the differentiation between others was seen in the amount of clustering or stereotypy along the dimensions, and the differentiation between the self and others was judged by the amount of flexibility (that is, the movement of the self in relation to others from dimension to dimension) and the discrimination of the self from others on the dimension. The matrices of interjudge agreement on these two factors are shown in Table 8. Again there were no opposite judgments among the judges, only differences in their conservatism. For example judges B and C used all categories while judge A sometimes used only 2 of the 3 categories.

Table 9 shows the results of the pre and post tests on the 1500 program, and Table 10 gives the results of the group test. The score agreed upon by 2 out of the 3 judges was chosen as the final one in all cases.

TABLE 7

INTER-JUDGE AGREEMENT ON DISCRIMINATION

1500 PROGRAM

		Judge B			
		-	0	+	Total
Judge A	-	1			1
	0	5	1	2	8
	+		1	2	3
Total		6	2	4	12

GROUP TEST

		Judge B			
		-	0	+	Total
Judge A	-	3			3
	0	1	4	2	7
	+		1	2	3
Total		4	5	4	13

		Judge C			
		-	0	+	Total
Judge A	-	1			1
	0	1	6	1	8
	+		1	2	3
Total		2	7	3	12

		Judge C			
		-	0	+	Total
Judge A	-	2	1		3
	0	1	6		7
	+		2	1	3
Total		3	9	1	13

		Judge B			
		-	0	+	Total
Judge C	-	2			2
	0	4	1	2	7
	+		1	2	3
Total		6	2	4	12

		Judge B			
		-	0	+	Total
Judge C	-	2	1		3
	0	3	4	2	9
	+			1	1
Total		5	5	3	13

TABLE 8

INTER-JUDGE AGREEMENT ON GROUP TEST

DIFFERENTIATION OF SELF FROM OTHER

		Judge B			
		-	0	+	Total
Judge A	-	1	1		2
	0	5	4	2	11
	+				
Total		6	5	2	13

		Judge C			
		-	0	+	Total
Judge A	-		2		2
	0	3	7	1	11
	+				
Total		3	9	1	13

		Judge B			
		-	0	+	Total
Judge C	-	3			3
	0	3	5	1	9
	+			1	1
Total		6	5	2	13

DIFFERENTIATION BETWEEN OTHERS

		Judge B			
		-	0	+	Total
Judge A	-	1			1
	0	2	5	2	9
	+		2	1	3
Total		3	7	3	13

		Judge C			
		-	0	+	Total
Judge A	-	1			1
	0	2	7		9
	+		1	2	3
Total		3	8	2	13

		Judge B			
		-	0	+	Total
Judge C	-	2			2
	0	1	6	2	9
	+		1	1	2
Total		3	7	3	13

TABLE 9

FINAL RESULTS - 1500 PROGRAM

"0" - no change
"+" - positive change
"-" - negative change

"apt" - aptitude
"beh" - behavior

Subject	Number of Dimensions Time 1	Number of Dimensions Time 2	Discrimination	Relation to Glass (1967) data Time 1	Relation to Glass (1967) data Time 2	Dimensions	Interpreted
A	3	2	+	-	0	apt.	apt.
B	2	3	0	0	+	beh.	beh., apt.
C	3	4	-	-	0	apt.&home	apt., home
D	3	3	+	+	+	beh., apt.	home, apt.& beh., apt.&beh.
E	3	3	0	-	0	home	home
F	2	2	0	0	+	beh.	beh., beh.&apt.
G	3	4	0	+	0	apt., beh.	home, beh.
I	3	3	0	-	-	--	beh.
J	3	2	+	+	0	beh.&home, apt.	beh.
K	3	2	-	+	0	home, apt., beh.	home
L	3	3	0	-	-	apt.&home	home
M	3	3	+	+	0	home, beh.	beh.
Totals			+2	0	+1		

TABLE 10

FINAL RESULTS - GROUP TEST

"0" - no change
"+" - postive change
"-" - negative change

Subjects	Number of Dimensions Time 1	Time 2	Discrimination	Differentiation of Self From Other	Between Others
A	3	5	0	0	0
B	3	3	0	0	+
C	4	3	-	0	0
D	4	4	-	-	-
E	3	4	0	-	0
F	1	1	0	0	0
G	3	4	0	0	0
H	5	4	0	-	0
I	3	4	0	0	-
J	3	3	+	-	0
K	1	2	+	0	+
L	3	4	-	0	-
M	3	3	0	+	0
Totals		+5	-1	-3	-1

The relations of the dimensions on the 1500 program to those of Glass (1967) as shown in Table 9 were derived from the numerical frequency of the use of the three dimensions of aptitude, behavior and home. If less than half of the dimensions used by a subject were identified as one of or a combination of the three, a "-" (minus) score was assigned. More than half earned a "+" (plus) score, and an "0" score was given when exactly half of the dimensions were interpretable.

Before discussing the findings a brief description of the subjects is in order. The information that follows includes that given by the group leader when assessing the success of the group subsequent to its completion.

> Subject A is a male in his early thirties who has had some teaching experience. He was one of the group members who took up a substantial amount of group time and focus, and was considered to have played an active role in the group.
>
> Subject B is male and in his late twenties. He has had both teaching and couseling experience and was rated as one of the persons who prior to the group experience, was already very sensitive to himself and others.
>
> Subject C is a female in her early thirties who has had teaching experience. She was one of the members with whom a good deal of time and focus was spent, and she was considered to have changed toward greater understanding of herself.
>
> Subject D is a male student in his mid-twenties who was not a counseling student but was in the area of measurement and research. He was considered to have changed the most of anyone toward the direction of greater conceptual complexity and understanding in his perceptions of self and others.
>
> Subject E is a male in his early thirties. He was considered to be neither active nor inactive in the group.
>
> Subject F is a male, also in his early thirties. He has had both counseling and teaching experience.

Subject G is a male in his early thirties who has had both counseling and administrative experience. He was rated as one of the more verbal members of the group.

Subject H is a female in her late thirties and a part-time graduate student. She is one of the persons with whom significant group time and energy was taken.

Subject I is a male in his forties. He was considered to be one of the more verbal members of the group.

Subject J is a female in her mid-twenties. She is Negro. She was absent frequently from the group. She was considered to be quite sensitive to herself and others prior to the group experience.

Subject K is a male in his mid-twenties who has had both teaching and counseling experience. The group leader thought that his level of complexity might have declined during the time of the group.

Subject L is a female in her late twenties with teaching experience. She is a Thai student. She was considered to be the least affected by the group.

Subject M is a female in her thirties who has had teaching, counseling and administrative experience. Although she is a nun, she dressed in street clothes and did not use her title to address herself, but on the group test form she was referred to as "Sister _____."

Also pertinent here is the group leader's evaluation of the developmental level of the group in general. He considered the group to have been ineffective with regard to the purpose of developing greater sensitivity to and understanding of the self and others. He reported that the group members did not develop a sufficient amount of trust and consequently the group as an entity did not form. This is not to say that individual learning did not occur, but that the group itself was not successful.

Tables 9 and 10 show that there were no substantial changes from time 1 to time 2 on either the group test or the 1500 program.

There were however, some directions of change worth considering.

On the average, there was an increase in the number of dimensions used from time 1 to time 2 on the group test, while on the 1500 program there was no change. These findings are explainable since it could be expected that the group members would know each other better over time.

The level of integration as judged by the amount of discrimination decreased over time on the group test and increased on the 1500 program. In both cases this change differed from that found in the number of dimensions. With integration being possibly more related than differentiation to conceptual complexity (Schroder et al, 1967; Sawatzky, 1969), it would seem that there was more change in the level of conceptual complexity of the subjects on the 1500 program than on the group test. Since the T group was not successful this is not a surprising result. In fact, it may be reasonable to conclude from these findings that a T group, particularly a poorly developed one, can affect the amount of differentiation of a conceptual system more readily than the level of integration of a system. That is, the participants may become more sensitive and aware of an increased number of dimensions in their perceptions of others, but they may not learn to better integrate their knowledge.

The differentiation of self from other and between others on the group test decreased in both cases over time, with the former showing the greatest decline. This, along with the decrease in discrimination or integration would seem to indicate that the T group had a generally negative effect on the conceptual complexity of the participants.

The relation of the 1500 program data to those of Glass (1967) increased from time 1 to time 2. That is, the subjects tended to use more of the prescribed dimensions on the post test. Since increased abstractness entails the use of more internally derived dimensions over externally induced ones, this finding would indicate that the level of complexity of the subjects declined from time 1 to time 2.

Results on Individuals

The group leader pointed to persons A, C and H as the ones with whom the group spent a good deal of time. The group test data on these three subjects shows no positive changes except for an increase in the number of dimensions for person A. Persons C and H were the only ones on the group test who showed a decrease in the number of dimensions. We may conclude from this data then, that the T group tended to have a negative effect on the conceptual level of those persons who were rated as being the most actively involved in the group.

On the 1500 program subjects A and C (H was absent) showed both positive and negative results, with the balance being on the positive side. Outside of the group then, these persons did seem to show some increase in conceptual complexity.

Subjects B and J who were rated as being sensitive prior to the T group experience, showed no general patterns of change on either the group test or the 1500 program.

Subject D was considered by the group leader to have increased the most of all in conceptual complexity, but the test results generally show the opposite trend. On the group test person D had no change in

the number of dimensions, but on integration and differentiation of self from others and between others he consistently declined from time 1 to time 2. He was the only subject for whom this occurred. On the 1500 program he again showed no change in the number of dimensions, but he had an increase in integration. He was the only one who had a positive (and, therefore, low conceptual level) relation to the Glass data at both times 1 and 2.

For subject K who was rated as declining in abstractness, the group test data showed mostly a positive change and the 1500 program data indicated a negative change.

The least affected person in the T group was considered to be subject L. On the 1500 program she showed no changes and on the group test she had some changes, both positive and negative.

For the most part then, the group leader's evaluations of individual subjects were not substantiated by the test results. In fact, the general trend of some positive changes in complexity on the 1500 program and overall negative effects of the T group on the group test were evident once again.

When the results of the males were compared to those of the females it was found that there were no strong directions of change in either case. It appeared that the females on the average changed more frequently then the males, and this may indicate that they are more readily affected by a T group experience. This finding although not significant, may reflect more openess and flexibility on the part of females and in turn may tend to support the contention of others (see

previous references) that females are more conceptually complex than males. On the other hand however, this finding may indicate just the opposite, that is that females are less conceptually complex than males. Since the T group was poorly developed we might say that it was functioning at a low level of complexity and thus only those persons of lower complexity, in this case the females more often than the males, would be positively affected by the T group.

CHAPTER V

SUMMARY, DISCUSSION & RECOMMENDATIONS

Summary of Results

The results of the present study showed no substantial changes in the conceptual level of the subjects following a T group experience. The small changes toward a decrease in abstract functioning were in terms of integration and differentiation of self from other and between others on the group test, and in the number of internally derived dimensions on the 1500 program. The positive changes were in the number of dimensions on the group test and in integration on the 1500 program. The impressions of the group leader regarding the effect of the group on particularly individuals were largely not supported by the data.

Discussion

The first stated purpose of this study was concerned with the application of MDS to person perception data in a T group. The MDS procedure employed was found to be very useful and during the course of investigation of the data several decisions arose out of the problems of analysis. For example, when determining the number of dimensions used by a subject it was decided to use Kruskal's (1964) "good" stress of 5% as the cut-off value rather than the "elbow in the curve" on the graphs showing the dependence of minimum stress on dimension. This made the decisions consistent among the data and gave a more objective measure of data which were not always open to clear decision using the elbow in the curve method.

Another problem encountered in analysis was in determining the best procedure within the bounds of the MDS model used for interpreting integration. Upon consulting Schroder et al (1967) it was clear to the investigators that the most appropriate procedure for determining integration was to collect judgments of discrimination. At one point two methods of doing this were compared. The writer's judgments of discrimination as operationally defined in Chapter IV were compared with the results obtained when calculating the average variance of stimuli along a dimension (as taken from the scale values shown in Tables 5 and 6). This latter method indicated the overall breadth of dimensions but failed to represent the pattern of organization of stimuli along a dimension, a crucial factor in the judgment of discrimination. It was concluded that judgments according to visual patterns of the ordering of stimuli along a dimension were the most appropriate for determing abstractness. For both validity and reliability it was necessary, however, to employ more than one judge in this regard. Since the inter-judge decisions were not entirely consistent a more extensive training program for judges than that given in the present study might be helpful.

A critical area in MDS lies in the interpretation of particular dimensions. It was found in this study that individual dimensions were not interpretable. The problem seemed to lie in a restriction inherent in MDS that only those dimensions of stimuli which underly a particular complex attribute are counted. As a result trivial dimensions are eliminated but at the same time not all critical attributes of a set of stimuli are measured. With persons as the stimuli in this study the data reflected dimensions of a very complex attribute indeed. This made interpretation very difficult since the dimensions were of such higher-

order cognitive operations. It would seem that the best solution would be to use the Rep test (Kelly, 1955) or Object Sorting (Goldstein and Scheerer, 1941; Sloane 1959; Clayton, 1959; Scott, 1961; 1962) along with MDS as Schroder et al (1967) have suggested. The dimensions defined by these two tests could be given separate MDS analyses, and it could then be determined whether in fact the dimensions were being used and even how they were being used. Another technique would be to give repeated MDS analyses (Schroder et al) on dimensions to be specified by an investigator. For example, subjects could be asked to judge a set of stimulus persons on an attribute such as goodness. The advantage of using the Rep test or Object Sorting lies in the fact that the dimensions specified are elicited by the subjects themselves. This projective quality wherein subjects generate their own dimensions is of course one of the primary reasons why MDS is applicable and favorable to measuring judgments in person perception.

The second stated purpose of this study had to do with investigating the effect of a T group on the conceptual complexity of its members. The results overall showed that from time 1 to time 2 the subjects tended to decline in abstract functioning and if the T group was operative here, those involved in human relations training should be cautioned. Some may point out that the function of a T group is to help its members deal less with abstractions and more with concrete, specific, here-and-now behavior, and this is so, but abstractness as it is defined in this study is dealing with integrative thought and is believed to be associated with greater understanding, sensitivity and

cognitive grasp of a social interaction. The two means of abstractness are not incompatible for it is the writer's opinion that paradoxically the person functioning with highly abstract, integrative thought is the person most able to perceive others and himself with clarity and as a result he is capable of dealing with situations and human interactions at their most basic level. We need only to look at good poets or writers for example, who are able to express highly abstract concepts with terms and word patterns that reflect concrete, descriptive, "down to earth" realities. The T groups seem to be an attempt to right this misunderstood paradox of man's ability to abstract, for along with their goal of greater self and social awareness they emphasize specific description of behavior, direct and open feedback, expression and awareness of here-and-now feeling and so on. Whether they are or can be effective in this role is of course a question for study and if the present results have reflected accurately an existing situation and T groups can have negative effects on conceptual complexity, precautions in group procedure and further research on the effects of T groups and T group methods should be undertaken. It follows also that the use of T groups in counselor training programs should be further evaluated.

As mentioned above in Chapter IV the results of this study may indicate that a T group can effect the degree of differentiation or number of dimensions of a conceptual system more readily than the level of integration of a system. Integrative complexity may take more time to develop and perhaps would only arise some months after a T group experience. This is yet to be investigated. It is possible also that

T groups as they now exist cannot significantly affect integrative complexity.

Some Criticisms

One of the problems in evaluating the T group in this study arose from the fact that it met only once a week and as a consequence it had difficulty in developing and maintaining a significant level of intensity from week to week. This pattern may have minimized the effect of the group on the participants and may have been an important factor in this study. For a more effective T group it may be more advisable to meet on consecutive days or on a residential basis.

The character descriptions developed by Glass (1967) also warrant some criticism. It is the writer's opinion that in some cases the comments about school behavior and home life are heavily value laden according to a now passe social code. For example, "smoking on the school grounds" is not likely to be considered deliquent behavior today, and neither is the situation of a broken home necessarily considered to be a negative influence in today's society. What Glass felt to be a behavior problem may be a faulty judgment and his descriptions may be obsolete and therefore poorly discriminating.

The validity of Glass's descriptions were never tested out by the investigators of this study, but it could be done using MDS. By having subjects respond to pairs of descriptions according to the emphasized dimensions Glass has indicated in each description, it could be determined using MDS whether those dimensions do in fact emerge. How obsolete, discriminating and valid the character descriptions are could

then be scientifically established.

There were two items on the group test form that in retrospect were felt to be in error. One was the inclusion of the title "Sister _____" in the list of group members to be compared. Stereotyped associations may have been encouraged by this label during the similarity judgments.

The second improvement could have been in the 9 point scale given on the group test form. Nine points were chosen since the scale on the 1500 program was from 1 to 9, but on the group test form the scale ranged from 1 to 5 with the half points being included to stretch it to 9 intervals. As a result some of the subjects tended to ignore the half points and used only a 5 point scale. This produced data with many ties. Such data do not provide clear results when analyzed by the Kruskal technique.

Recommendations

It is strongly recommended that MDS be applied further to the study of conceptual complexity and person perception and that it also be investigated fully as to its validity and reliability. MDS procedures could be investigated by having respondents answer in a particular way to see if the dimensions that are supposed to emerge do.

Other methods for determining integration using MDS might be compared with the method used here. Driver's (1962) approach with MDS seemed to indicate a relationship between the weighting of dimensions and integration and Schroder et al (1967) cite studies that have used MDS to establish the prevalance in abstract systems of internally derived dimensions over externally given ones. Comparison of these methods of

MDS analysis might lead to their combination and to more extensive statistical investigation of integrative complexity.

Besides organizing T groups on a residential or daily basis to attempt maximum effect the suggestion of Harvey et al (1961) is worth considering and investigating. They suggested that progression of conceptual systems might best be brought about in a group setting up creating homogeneous groups according to the level of conceptual complexity of the individuals and by fitting the most appropriate or facilitative group method to them. Individuals of similar conceptual complexity are less likely to hamper each other in their development than are individuals of varying levels of complexity, and a state of synchrony between individual and group forces would be the optimum condition for the successful development of conceptual structures. Furthermore, since T groups are characterized by lack of external structure, self exploration, open feedback and other correlates of high conceptual complexity their application might be best suited to persons of equally high complexity. Variations in T group methods could be developed according to the conceptual level of the participants. At present T group procedure is largely a function of the trainer who must be sensitive to "where the group is at" or "where the individual members are at" and then react accordingly to facilitate growth. The use of tests to establish levels of conceptual complexity (for example as in Harvey et al, 1961) and the formation of homogeneous groups might simplify the trainer's job. There could be several other avenues as well to pursue as a result of the application of cognitive theories to T group theory and method.

Since the present study was designed mainly as an exploratory one a control group was not included. Having tested out the application of an MDS procedure to conceptual complexity and person perception data and found the method to be fruitful, a well controlled study would be advisable. Establishing the level of abstract functioning of the individuals prior to a group could be done so that the group method used could be evaluated in relation to its effects on the participants over time. Also, due to the fact that effects of T groups have often been found to be most significant a few months after the experience, it would be best to design a study incorporating a follow-up test.

Upon completion of the present study several questions were left in the mind of the investigator with the majority of them centering around integrative complexity. What is the nature of integrative thought and its development? Can the integration of a person's conceptual system be measured effectively and can it be changed by external environmental manipulation?

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APPENDIX A

GROUP TEST FORM

(names omitted)

	very alike				very dissimilar
AB	1	2	3	4	5
AC	1	2	3	4	5
AD	1	2	3	4	5
AE	1	2	3	4	5
AF	1	2	3	4	5
AG	1	2	3	4	5
AH	1	2	3	4	5
AI	1	2	3	4	5
AJ	1	2	3	4	5
AK	1	2	3	4	5
AL	1	2	3	4	5
AM	1	2	3	4	5
BC	1	2	3	4	5
BD	1	2	3	4	5
BE	1	2	3	4	5
BF	1	2	3	4	5
BG	1	2	3	4	5
BH	1	2	3	4	5
BI	1	2	3	4	5
BJ	1	2	3	4	5
BK	1	2	3	4	5
BL	1	2	3	4	5
BM	1	2	3	4	5
CD	1	2	3	4	5
CE	1	2	3	4	5
CF	1	2	3	4	5
CG	1	2	3	4	5
CH	1	2	3	4	5
CI	1	2	3	4	5
CJ	1	2	3	4	5
CK	1	2	3	4	5
CL	1	2	3	4	5
CM	1	2	3	4	5
DE	1	2	3	4	5
DF	1	2	3	4	5
DG	1	2	3	4	5
DH	1	2	3	4	5
DI	1	2	3	4	5
DJ	1	2	3	4	5
DK	1	2	3	4	5
DL	1	2	3	4	5

	very alike				very dissimilar
DM	1	2	3	4	5
EF	1	2	3	4	5
EG	1	2	3	4	5
EH	1	2	3	4	5
EI	1	2	3	4	5
EJ	1	2	3	4	5
EK	1	2	3	4	5
EL	1	2	3	4	5
EM	1	2	3	4	5
FG	1	2	3	4	5
FH	1	2	3	4	5
FI	1	2	3	4	5
FJ	1	2	3	4	5
FK	1	2	3	4	5
FL	1	2	3	4	5
FM	1	2	3	4	5
GH	1	2	3	4	5
GI	1	2	3	4	5
GJ	1	2	3	4	5
GK	1	2	3	4	5
GL	1	2	3	4	5
GM	1	2	3	4	5
HI	1	2	3	4	5
HJ	1	2	3	4	5
HK	1	2	3	4	5
HL	1	2	3	4	5
HM	1	2	3	4	5
IJ	1	2	3	4	5
IK	1	2	3	4	5
IL	1	2	3	4	5
IM	1	2	3	4	5
JK	1	2	3	4	5
JL	1	2	3	4	5
JM	1	2	3	4	5
KL	1	2	3	4	5
KM	1	2	3	4	5
LM	1	2	3	4	5

APPENDIX B

GLASS (1967) CHARACTER DESCRIPTIONS

Clark Adams

Clark has all of the attributes necessary to go far in the world. His father is a cuessful lawyer; his mother is a homemaker and president of the PTA. He has a sister in college and a twin sister in his same grade. He and his twin sister have a friendly relationship at school. Clark is a help to his teachers instead of a hindrance. He's cooperative and helpful. Clark's interests are in science; he has performed an original experiment in physics. His carrer plans--theoretical physics--may very well be realized. His friends sometimes describe him as shy; others find him friendly and outgoing.

Martin Smith

Marty has never shown a flair for study; although he makes a sincere effort in his studies, his understanding seems to be minimal. He shows little intellectual promise. Marty does have a steady girl-friend. His father and mother appear not to provide adequate care for him. His father drinks to excess; his mother is the sole supporter of the family. In class, Marty is a well-mannered, young gentleman. His favorite class is geometry; his grades have been best in industrial arts courses. Perhaps, Marty might fit well in a trade school after graduation.

Thomas Markus

Tom finds school-work difficult to comprehend. He is by nature slower than most students, but he obtains a lot of help from his parents and brothers. His mother and father provide Tom a warm home-life so that he can make the best of his abilities, meager though they may be. Nevertheless, under the stress of classroom learning, he begins to oppose teacher discipline and often winds up in trouble. Tom has been reprimanded twice for smoking on the school grounds.

Bob Levine

Bob is the class jester. Nothing is sacred to him; everything is a potential target for his lightning wit. He often delights his classmates, but he does so to the despair of his teachers. His quick mind makes him difficult to handle. But there's no doubt that he is very bright. He can race through his studies without sacrificing understanding of the material. He has a passion for paperback books--his locker is full of them. Both Bob's mother and father are successful college teachers. They don't worry about his classroom antics because they are close to him and are convinced that he is basically a well-adjusted boy.

Jim Edwards

Jim presents special problems to his teachers and the other students. He is often inattentive and rowdy in class; he has disrupted the entire class on numerous occasions. His teachers suspect his problems stem from both a low aptitude for intellectual work (his Stanford-Binet IQ is 92) and his home life. Jim and his mother were deserted by Jim's father eleven years ago. Jim's hobby is cars and go-karting.

Paul Stalbeck

Paul likes music and plays a trumpet in a dance band. Mr. and Mrs. Stalbeck are loving, accepting parents who have taught Paul self-discipline and how to get along with others. His father is retired from military service. Both father and mother participate in the PTA. Paul has many friends among the better-behaved students; he disapproves of those students who make scenes and disturbances in class. His most diligent efforts result in only below average grades, however. College seems out of the question for Paul. Perhaps he would do well to follow his father's footsteps.

Arnold Lund

Arnold is a "petunia in an onion patch." Though he has high mental ability (he is considered "gifted"), Arnold had the misfortune of inheriting parents who place little value on education. His father never finished high-school and is a construction worker; Arnold's mother is a laundress. They have been separated for three years. Although Arnold is capable of learning easily, he has no motivation to do so. He enjoys "baiting" his teachers and venting his hostilities on fellow students. Arnold's obesity may have something to do with his discipline problems. He has told his teachers that he would like to be an author of fiction.

Ted Moely

Ted's teachers marvel at him. He is consistently among the social and intellectual leaders in the classroom. One teacher remarked that if he had to delegate authority to one of his students, it would be to Ted. He has the brains to make it through any of the better colleges, if (and it's a big "if") he can get some help from home. Ted comes from the wrong side of the tracks. He must work after school and on weekends, in a grocery store, to help his father support the family. He has four brothers and a sister. Ted lost his mother when he was ten; his aunt has lived in the house since then. She and Ted often have differences, his guidance teacher reports.